APPENDIX 5

BRIDGE CONCEPTS

DESIGN CONCEPTS

The Anacostia Access Study paid special attention to the bridge because of the many factors that affect its design. The bridge must be a multimodal transportation connection across the Anacostia River, providing adequate capacity for the safe and convenient passage of motor vehicles, transit vehicles (potentially including a light rail line), bicycles, and pedestrians. The bridge's form and clearance must allow continued navigability of the river, including during its construction. The bridge's aesthetic and symbolic characteristics will be highly significant because of its prominence as a visual landmark on the river and along South Capitol Street. The bridge must be an asset to and an integral part of the neighborhoods and parks on both sides of the river.

A new bridge will be subject to regulatory and permitting requirements. Among others, the construction of a bridge across a navigable waterway requires a permit from the United States Coast Guard. The permit is statutorily required and the process to obtain it is defined in regulations.

DESIGN ELEMENTS

The bridge's setting and function dictate a set of necessary design elements:

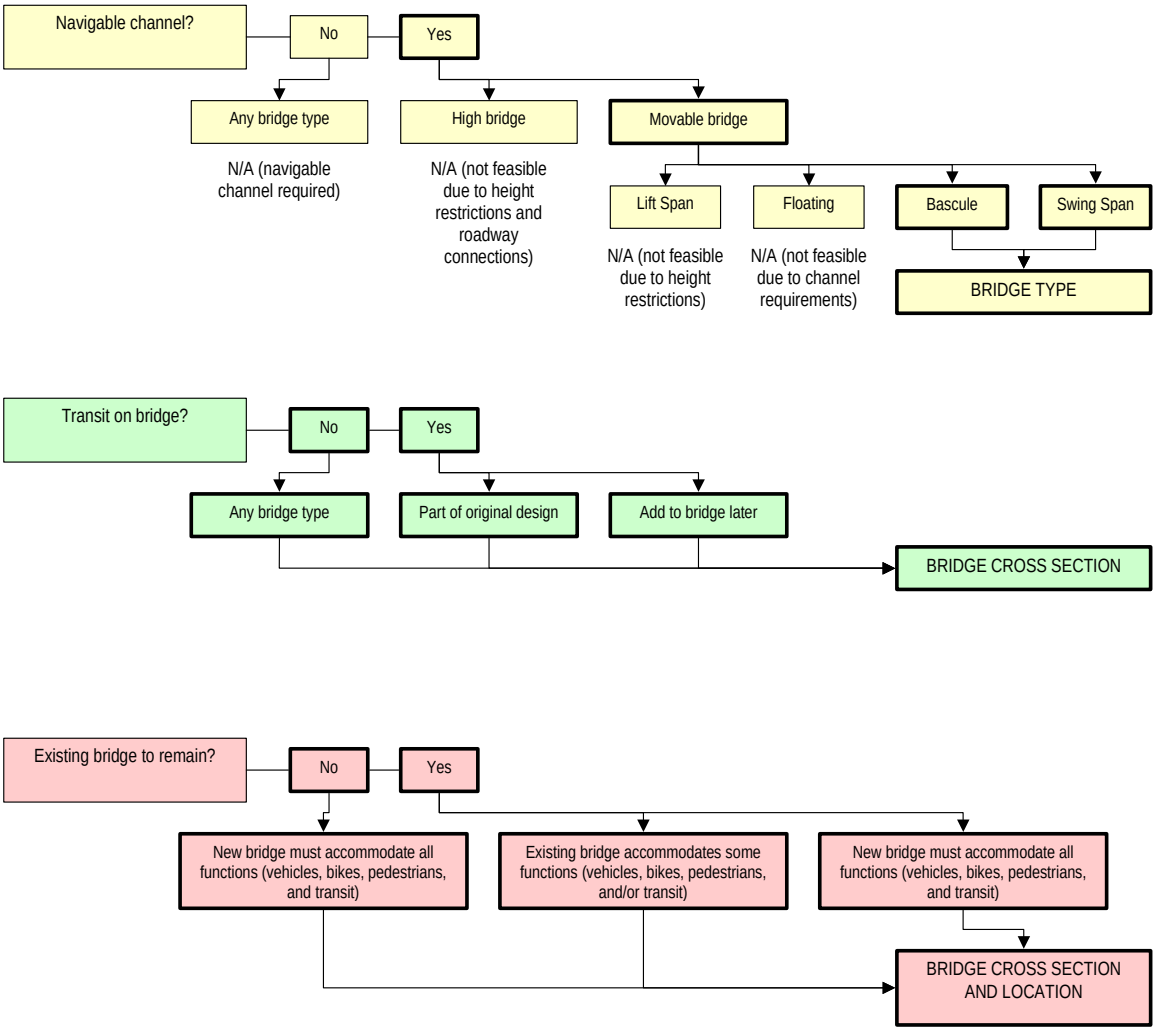
- The bridge should provide a smooth connection between the east and west sides of the river, serving as a continuation of Suitland Parkway to South Capitol Street and preferably aligned with the Washington Monument.
- The bridge should be part of a series of experiences for someone traveling to downtown DC from the east (such as from Andrews Air Force Base for diplomats visiting the city) and should serve as a gateway to the capital.
- The urban character of South Capitol Street, revitalized as a grand urban boulevard, should be carried across the bridge to Historic Anacostia.
- To accommodate future traffic, the bridge should carry six lanes of traffic (three in each direction) and have strong bicycle and pedestrian elements.
- The new bridge should initially accommodate transit or be designed such that transit can be added in the future.

Within these design elements, two questions are central to the bridge's design concept:

1. Given that a navigable channel needs to be maintained, what are the horizontal and vertical constraints? This answer has a direct impact on the **type** of bridge that can be built.
2. How should the bridge accommodate transit? This has a direct impact on the **cross section** of the bridge.

The decision trees shown in Figure 5-1 illustrate how these questions were addressed and resolved. As illustrated in the flowcharts, only lower bridges with swing span or bascule movable portions are feasible

Figure 5-1. Decision Trees



alternatives for a new Frederick Douglass Memorial Bridge. Each of these alternatives is discussed in greater detail in the following sections.

BRIDGE TYPES

The definition of the bridge type is the first issue in an investigation into the specific design of a new Frederick Douglass Memorial Bridge. Since the new bridge must still accommodate the passage of large Navy ships and sailing vessels, there are two general alternatives—a high bridge with enough clearance to permit the passage of large vessels, or a lower bridge with a movable span to allow for a clear navigation channel.

For the high bridge alternative, the clear height under the bridge superstructure would need to be approximately 150 feet over the width of the navigation channel. In comparison, the existing Frederick Douglass Memorial Bridge has a 55-foot clearance. A new bridge would need to be almost three times as high as the existing one. This would require an imposing structure that would divide the corridor even more than the current South Capitol Street.

The alternative consisting of a lower bridge with a movable span can be further refined based on the available types of movable spans. There are four main types of movable spans, shown in Table 5-1, each offering advantages and disadvantages both for operations and for compatibility with Washington's standards and restrictions. The disadvantages of two of these four are so great that they are not appropriate here. A lift-span bridge would be difficult to build to provide the needed vertical clearance, and a floating bridge would interfere with recreational boating on the Anacostia River. Either of the other two, a swing-span bridge and a bascule bridge, could be used on South Capitol Street.

COMPARISON MATRIX

Although the height of a new bridge has yet to be determined, a low bridge with a vertical clearance of approximately 35 feet and swing span or bascule movable spans would be the most feasible alternatives. Reducing the required channel width from 300 feet to 150 feet would help reduce the size of the movable span. Table 5-2 highlights some of the capabilities of these two types of movable-span bridges.

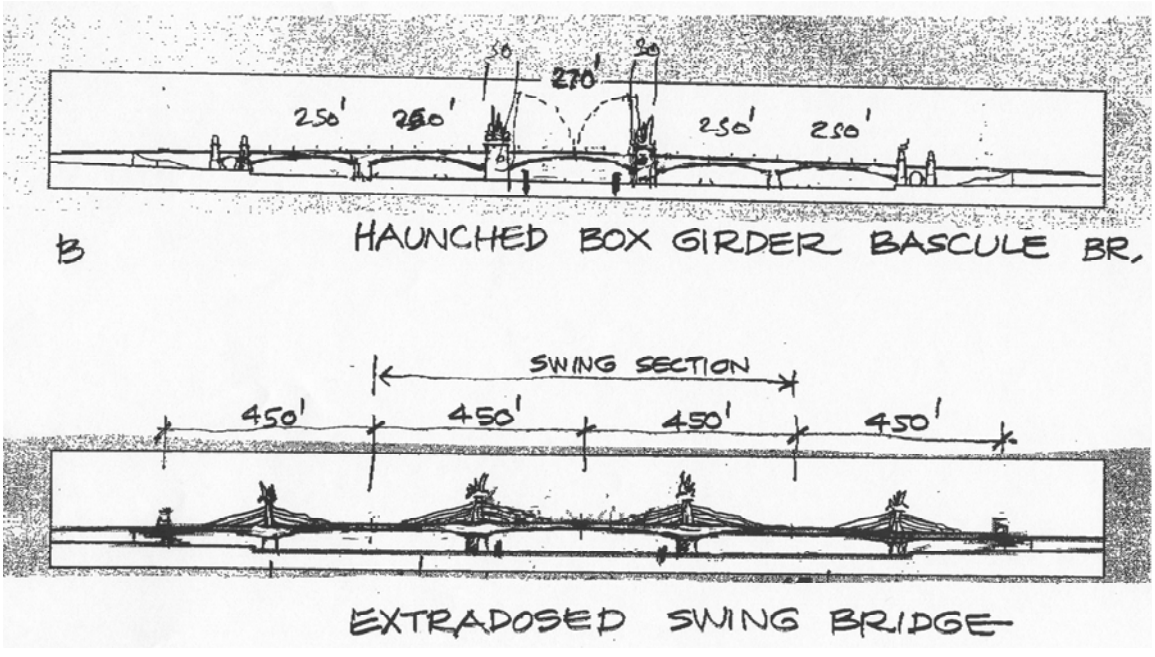
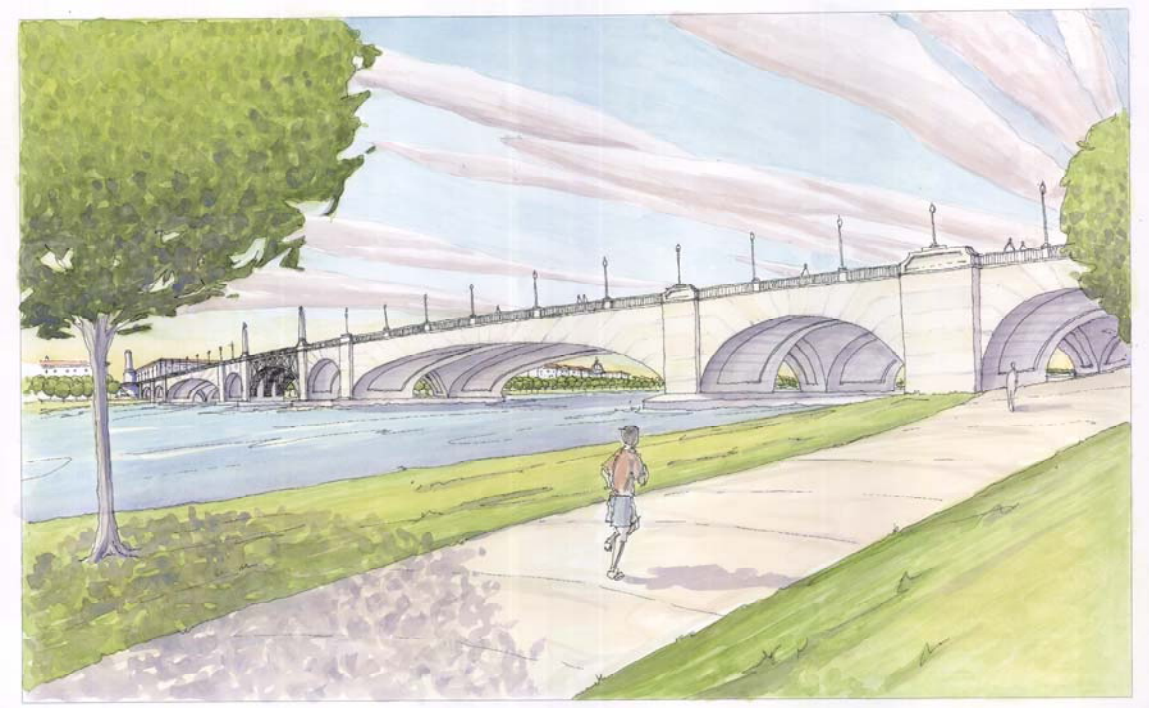


Table 5-2. Comparison Matrix

Type	**Functions**				**Cross Section and Configuration**	**Aesthetics**	**Horizontal Constraints**
	Vehicular	Pedestrian	Cyclists	Transit			During construction of the new bridge…
BASCULE	●	●	●	●	Twin parallel structures, with two leaves at opening required. Single set of movable spans over 150'-wide channel. Pedestrians and cyclists would be located on the outer edges of each parallel span. Transit would be accommodated on the inside edge of each parallel span, and can be built into the initial design or added later. Total width without transit of 106'±. Total width with transit of 134' to 143'.	Compatible with traditional Washington bridges. Architectural treatment can include a classical style or can accommodate more contemporary elements.	…new bascule opening will need to be offset from center of channel to align with existing bridge opening and channel and prevent conflicts with the existing pivot pier.
Swing Span	●	●	●	●	Single extradosed structure, with two rotating spans to provide clear 150'-wide channel. Transit would be accommodated in the center of the cross section between the parallel sets of support cables. If transit is not built into the initial design, pedestrians and cyclists would initially be located in the center of the bridge. When transit is added, they would be moved to cantilevered sections added to the outer edges of the bridge. Total width without transit of 106'±. Total width with transit of 134' to 143'.	Contemporary extradosed bridge design offers flexibility while providing an innovative approach and style.	…location of new pivot piers must be combined with sufficient span length to align new bridge opening with existing bridge opening and channel.
● Included in initial construction ● Can be included in initial construction or added later							



Pedestrian perspective below bascule bridge